Current IMS Database

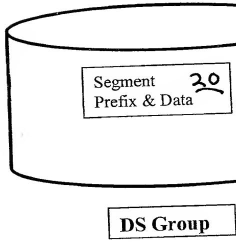

Fig 1A
(Prior Art)

Invention Database

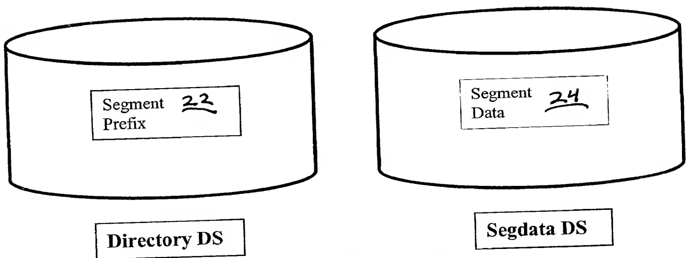

Fig 1B

Layout of Segment in Directory Dataset

Segment Prefix 26		Segment Data 28		
			Metadata	
Seg Code & Delete Byte 30	Prefix Pointers 32	Pointer to Seg Data 34	Seg Key 38	Born-0n-Date 36

Figure 2A. Split Segment Composition – Prefix Portion with Metadata in segment data portion

Layout of Segment in Segdata Dataset

Segment Prefix 26				Seg Data 28
		Metadata		
30 Seg Code & Delete Byte	Prefix Pointers 32	Seg Key 38	Born-0n-Date 36	34 Pointer to Seg Data

Figure 2B. Split Segment Composition – Prefix Portion with Metadata in segment prefix portion

Layout of Segment in Segdata Dataset

Segment Prefix 40	Segment Data 42	Trans-parent 44
Seg code & delete byte 46	User Data 48	Born on Date 50

Fig. 3

```
DBD     NAME=IVPDB1,ACCESS=(HIDAM,OSAM)

DIR     DD1=DFSIVD1,SIZE=2048,UOW=(500,50,10)

DATASET DD1=DFSIVD1A,DEVICE=3380,SIZE=2048
SEGM    NAME=A1111111,PARENT=0,BYTES=40,RULES=(LLV,LAST),PTR=(TB,CTR)
FIELD   NAME=(A1111111,SEQ,U),BYTES=010,START=00001,TYPE=C
FIELD   NAME=A9999999,BYTES=010,START=00011,TYPE=C
LCHILD NAME=(A1,IVPDB1I),POINTER=INDX,RULES=LAST
LCHILD NAME=(A1X,IVPDB1X),POINTER=INDX
XDFLD   NAME=AXXXXXXX,SEGMENT=A1111111,SRCH=(A9999999)
LCHILD NAME=(C1X,IVPDB1Z),POINTER=INDX
XDFLD   NAME=CXXXXXXX,SEGMENT=C1111111,SRCH=(C9999999)

DATASET DD1=DFSIVD1B,DEVICE=3380,SIZE=4096
SEGM    NAME=B1111111,PARENT=A1111111,BYTES=(1000,50),                X
              RULES=(LLV,LAST),PTR=(TB)
FIELD   NAME=(B1111111,SEQ,M),BYTES=010,START=00003,TYPE=C
FIELD   NAME=/SXB1
LCHILD NAME=(B1X,IVPDB1Y),POINTER=INDX
XDFLD..NAME=BXXXXXXX,SEGMENT=B1111111,SRCH=(B1111111),SUBSEQ=(/SXB1)

DATASET DD1=DFSIVD1C,DEVICE=3380,SIZE=8192
SEGM    NAME=C1111111,PARENT=B1111111,COMPRTN=(DFSKMPX0,DATA,INIT),   X
              RULES=(LLV,LAST),PTR=(TB),BYTES=(8000,50)
FIELD   NAME=(C1111111,SEQ,U),BYTES=010,START=00003,TYPE=C
FIELD   NAME=C9999999,BYTES=010,START=00011,TYPE=C

DIRGEN

DBDGEN
FINISH
END
```

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Figure 4A Sample HIDAM DBD

```
DBD     NAME=IVPDB2,ACCESS=HDAM,RMNAME=(DFSHDC40,4,1000)

DIR   DD1=DFSIVD2,UOW=(100,10)

DATASET DD1=DFSIVD2A,DEVICE=3380,SIZE=2048
SEGM    NAME=A1111111,PARENT=0,BYTES=40,RULES=(LLL,LAST),          X
              COMPRTN=(DFSKMPX0,DATA,INIT)
FIELD   NAME=(A1111111,SEQ,U),BYTES=010,START=00001,TYPE=C

DATASET DD1=DFSIVD2B,DEVICE=3380,SIZE=4096
SEGM    NAME=B1111111,PARENT=A1111111,BYTES=(1000,50),             X
              RULES=(LLV,LAST),PTR=(TB)
FIELD   NAME=(B1111111,SEQ,U),BYTES=010,START=00003,TYPE=C

DATASET DD1=DFSIVD2C,DEVICE=3380,SIZE=8192
SEGM    NAME=C1111111,PARENT=B1111111,COMPRTN=(DFSKMPX0,DATA,INIT),
        RULES=(LLV,LAST),PTR=TB,BYTES=8000
FIELD   NAME=(C1111111,SEQ,U),BYTES=010,START=00001,TYPE=C

DIRGEN

DBDGEN
FINISH
END
```

Figure 4B Sample HDAM DBD

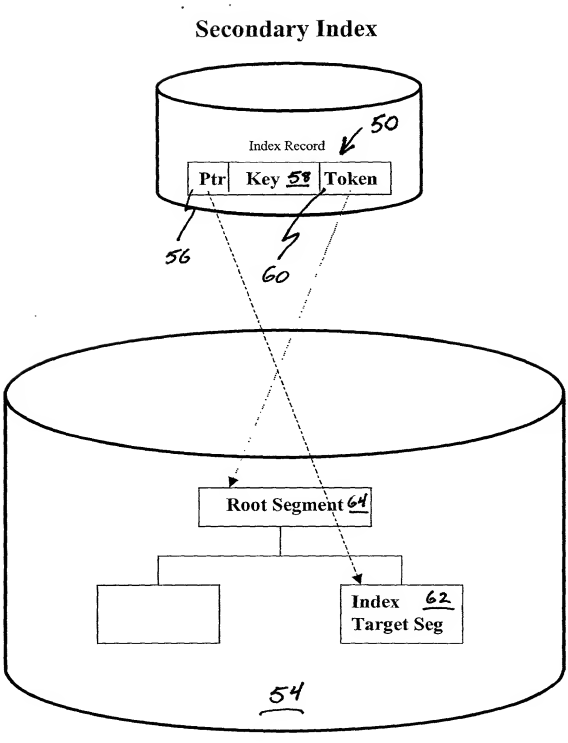

Figure 5 Secondary Index Architecture

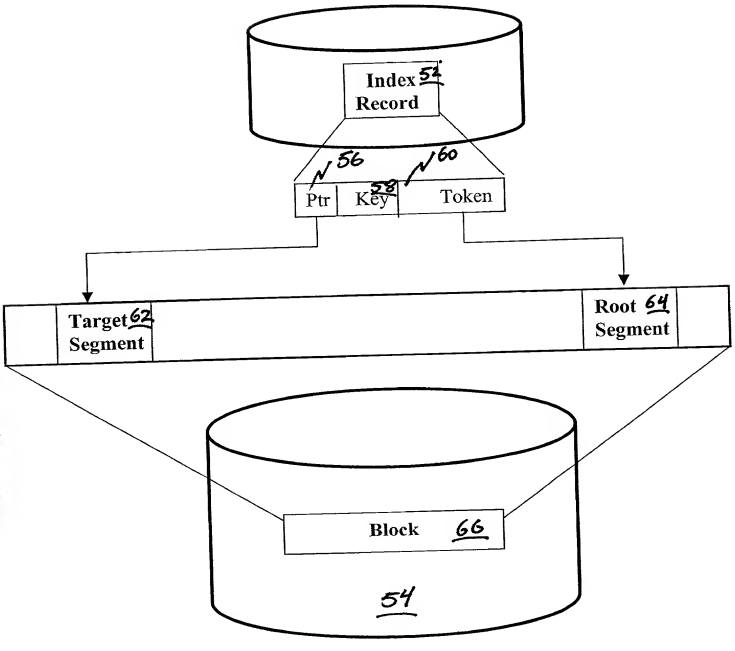

Figure 6 Secondary Index Before Reorganizing

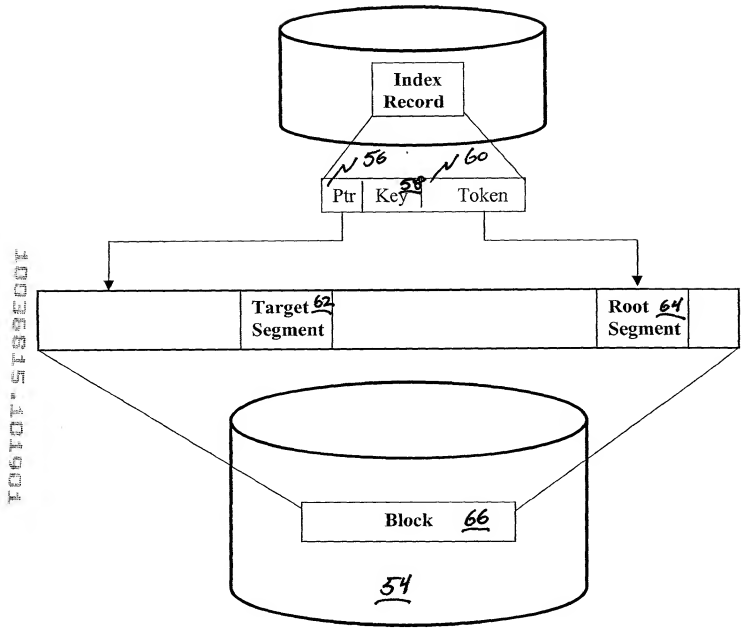

Figure 7 Secondary Index After Reorganizing

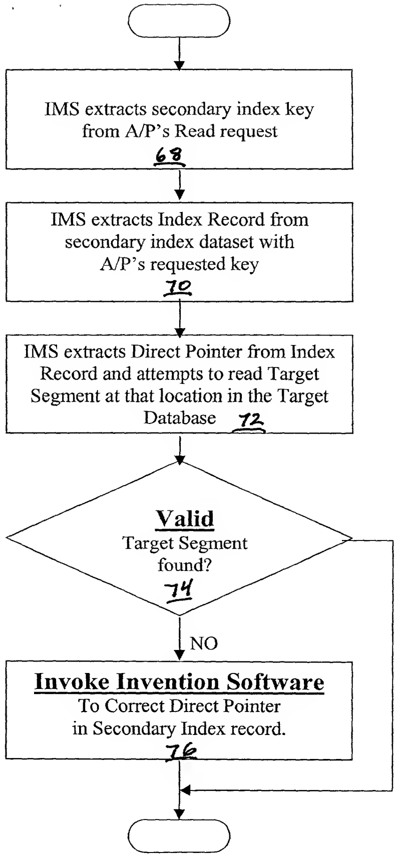

Figure 8 Retrieving a Target Segment via a Secondary Index

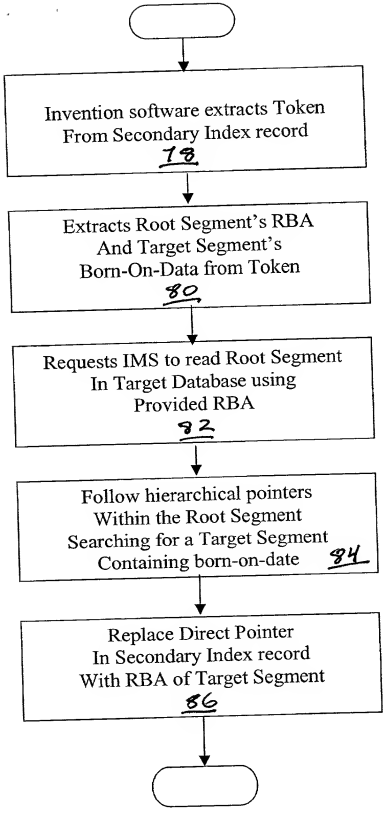

Figure 9 Correcting Direct Pointer in a Secondary Index

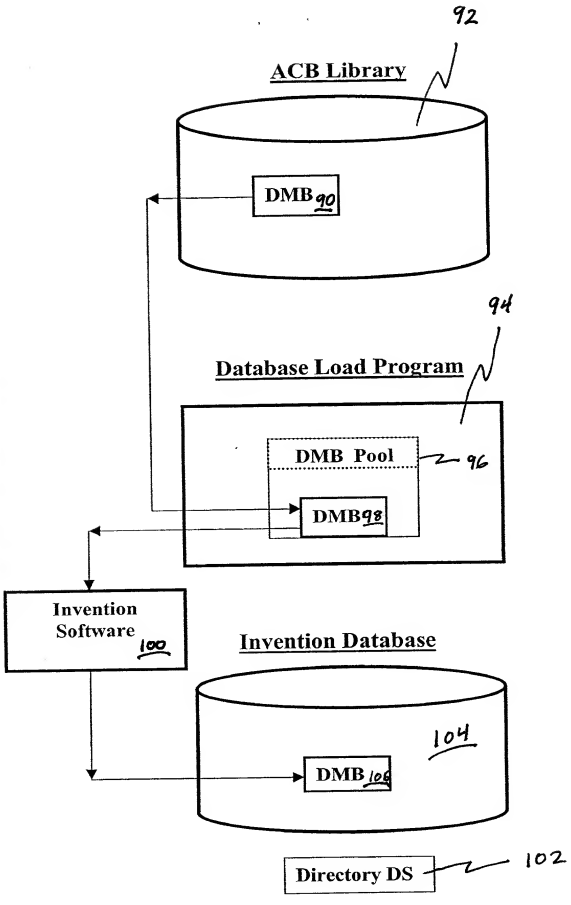

Figure 10 Saving the Database Definition at DB Load Time

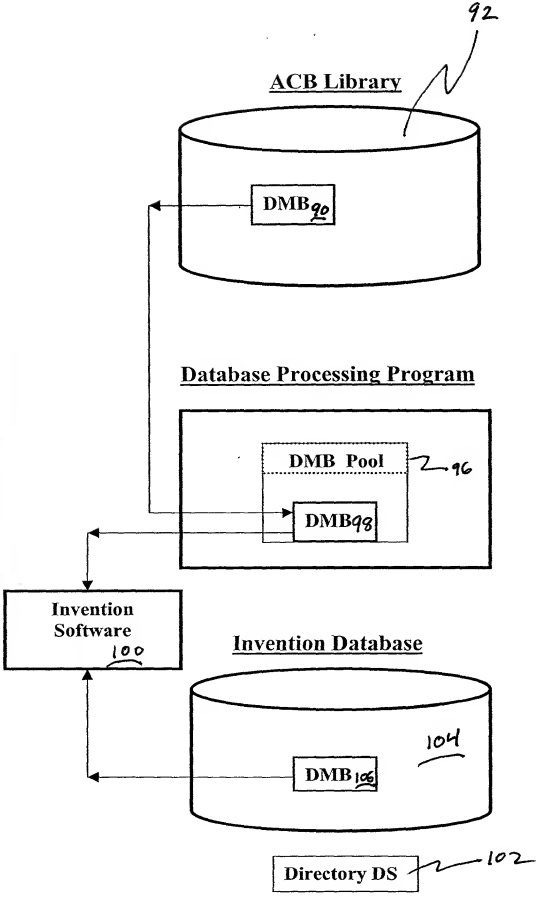

Figure 1\ Checking the Database Definition at DB Processing Time

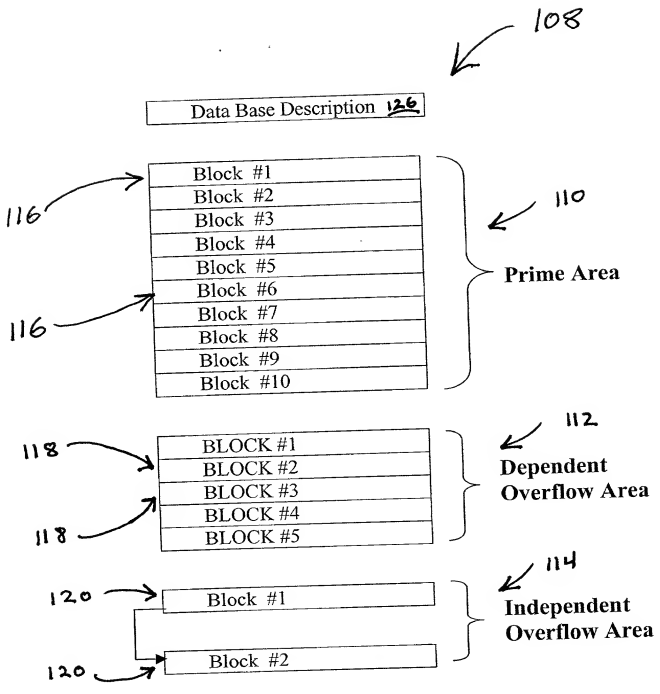

Figure 12. Unit Of Work (UOW) Architecture

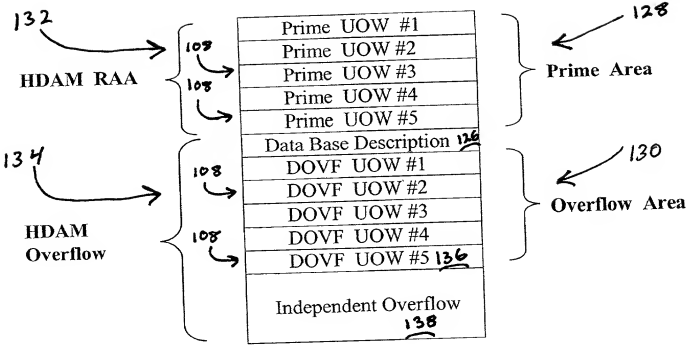

Figure 13. HDAM UOW Architecture

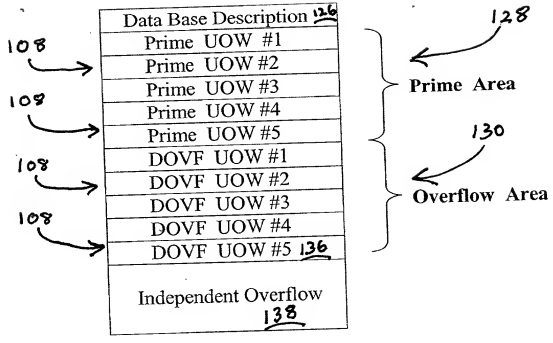

Figure 14. HIDAM UOW Architecture

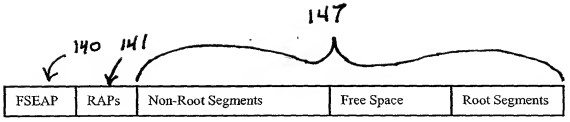

Figure 15. Prime & DOVF Block Composition

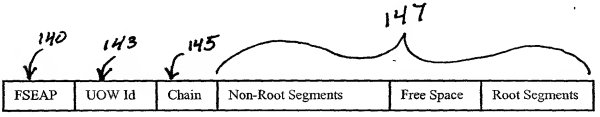

Figure 16. IOVF Block Composition

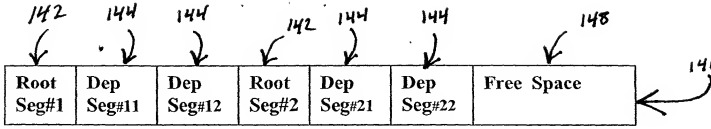

Figure 17 Block Composition Using IMS' Space Management

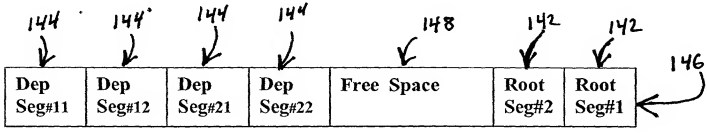

Figure 18 Block Composition Using Invention's Space Management

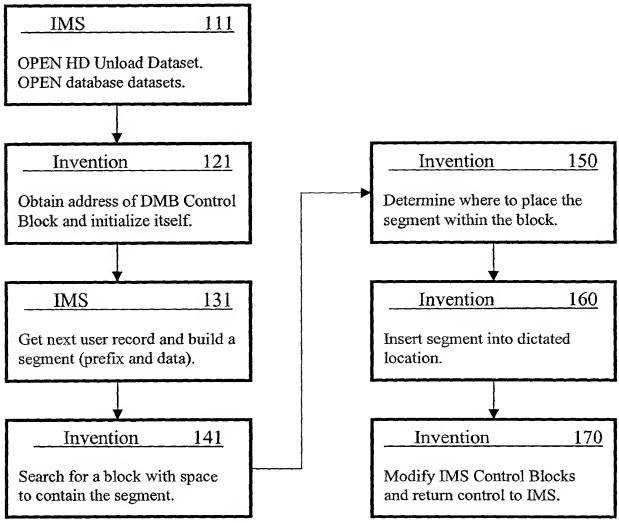

Figure 19 Space Management at Database Load Time

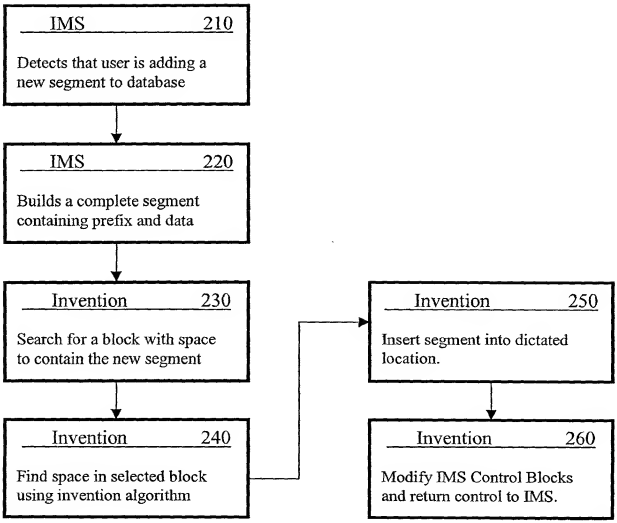

Figure 20 Space Management at Database Update Time

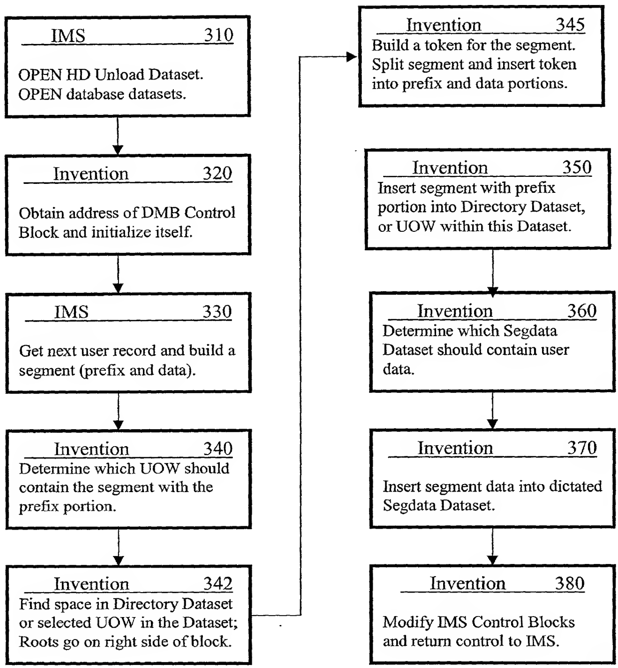
IMS 310
OPEN HD Unload Dataset.
OPEN database datasets.
Invention 320
Obtain address of DMB Control Block and initialize itself.
IMS 330
Get next user record and build a segment (prefix and data).
Invention 340
Determine which UOW should contain the segment with the prefix portion.
Invention 342
Find space in Directory Dataset or selected UOW in the Dataset; Roots go on right side of block.
Invention 345
Build a token for the segment. Split segment and insert token into prefix and data portions.
Invention 350
Insert segment with prefix portion into Directory Dataset, or UOW within this Dataset.
Invention 360
Determine which Segdata Dataset should contain user data.
Invention 370
Insert segment data into dictated Segdata Dataset.
Invention 380
Modify IMS Control Blocks and return control to IMS.

Figure 21. Space Management at Database Load Time

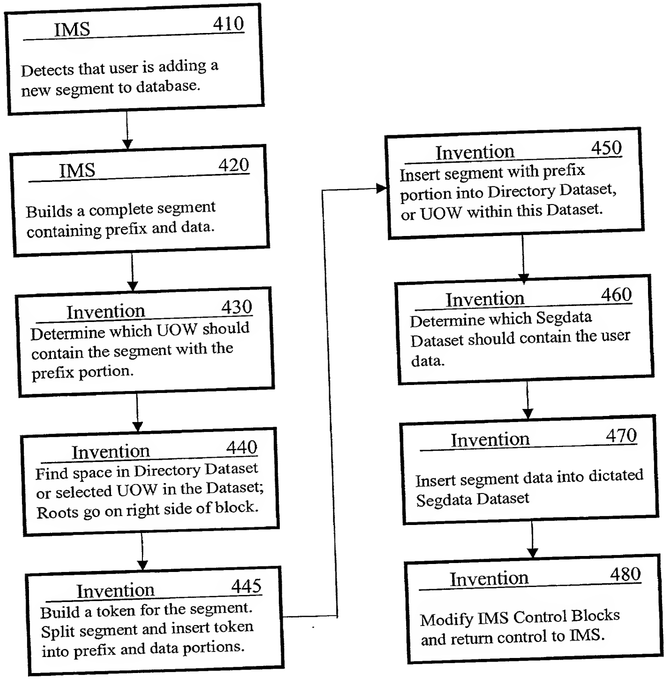
IMS 410
Detects that user is adding a new segment to database.
IMS 420
Builds a complete segment containing prefix and data.
Invention 430
Determine which UOW should contain the segment with the prefix portion.
Invention 440
Find space in Directory Dataset or selected UOW in the Dataset; Roots go on right side of block.
Invention 445
Build a token for the segment. Split segment and insert token into prefix and data portions.
Invention 450
Insert segment with prefix portion into Directory Dataset, or UOW within this Dataset.
Invention 460
Determine which Segdata Dataset should contain the user data.
Invention 470
Insert segment data into dictated Segdata Dataset
Invention 480
Modify IMS Control Blocks and return control to IMS.

Figure 22. Space Management at Database Update Time